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## **EXPLORING RESEARCH ACTIVITIES: THE ENGINEERING STUDENTS' EXPERIENCE**

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### **INTRODUCTION**



University students are constantly exposed and challenged to do various academic exercises that would prepare them for their academic excellence and future professional endeavor. The demand to equip these future professionals with skills that would enable them to meet the expectations of the university and later the industries is further aggravated when special requirements will have to be met before any program is accepted and recognised by special bodies such as the Malaysian Board of Engineers or the quality assurance standards set by the Ministry of Higher Education. For that reason, the teaching and learning process at the university has shifted from the common traditional lecture style to a more active form of learning. Therefore, knowledge is no longer acquired just by attending lectures, conducting laboratory experiments and by doing specific assignments for subject specific courses. Instead, it is also gained through hands-on learning that exposes and challenges students to use specific knowledge together with other soft skills such as problem solving, team working and communication.



In view of this, the training that students receive at the university now requires students to explore ways of integrating the use of different subject areas with soft skills such as communication and team working that resembles real working challenges. Most of the time, the assignments given would be based on problem solving or project based learning. Through these kinds of assignments students need to learn to work independently as well as collaboratively with other students.

For that matter, the Department of Modern Languages, Faculty of Management and Human Resource Development, UTM, has also introduced a new set of English language syllabus designed and offered to undergraduate students beginning Semester 1 of 2004/05 Session. The courses designed are for students who enter the university with different academic qualifications and experience like Matriculation Certificates, Form Six Certificate and Diploma. With this in mind, the department has decided to offer a more extensive English language program that would be able to cater for the needs of the new set of learners.

These students are expected to complete the following courses before they graduate:

Course	Year Taken	Number of Hours
English for Academic Communication	Year 1	4 contact hours
Advanced English for Academic Communication	Year 2	4 contact hours
Elective English Course	Year 3	2 contact hours

**Table 1 :** English language courses offered to undergraduate students



Based on the above table, the Advanced English for Academic Communication course which is offered after students have taken the English for Academic Communication course accentuates the oral and written communication skills through tasks related to academic research report. In the course, students are expected to carry out a small-scale research project in groups and are required to look for and extract relevant primary and secondary information from various primary as well as secondary sources. In the process of completing the project, students need to complete a sequence of tasks which eventually would contribute towards the presentation and writing of the research report using the English language.

One of the tasks that students have to do is the data collection task. For this task, they are expected to design questions for interview sessions and questionnaire survey in order to obtain primary data for the research project.

In order for students to carry out the research project, they would first have to write and present a research proposal. When the instructor has accepted the proposal, the group could proceed with the drafting of questions to collect their primary data. When the draft is completed, the students need to show it to the instructor so that it can be examined and improved. The students can only begin collecting the primary data after getting approval from the instructor. Using the research tool that they have designed, they are expected to carry out the survey(s) themselves.

When data have been gathered, they are then required to prepare the data so that they could describe and analyze the findings of their study. The whole process of gathering information that would eventually be used to generate a research report is a tedious but rewarding experience for these students.

Through the tasks given, they not only learn to conduct academic research projects in English, but they also acquire other important soft skills such as the following:



- Communication Skills
- Team-working
- Problem-solving
- Adaptability
- Life-long Learning
- Ethics
- Self-esteem

In other words, by exposing students to the skills of conducting research in English, the course has been able to train students for academic excellence through research work and prepare them for the needed soft skills that are expected in order to meet the quality standards of the Ministry of Higher Education and other professional bodies such as the Malaysian Board of Engineers.

## PURPOSE OF THE STUDY

This chapter will report a study which investigates the engineering students' perception of the data collection activity carried out as a group work for a research project in an English language course. The study was based on the Advanced English for Academic Communication course offered to second year undergraduate students in Universiti Teknologi Malaysia, Skudai.

## OBJECTIVES OF THE STUDY

This study has the following objectives:-

1. to identify the challenges faced by students in carrying out the data collection activity
2. to examine how students overcome the challenges faced
3. to find out the students' perception of the data collection activity as a task to develop their soft skills



## **SCOPE OF THE STUDY**

This study was based on the participation of students from three different engineering faculties in UTM. The participants were second year undergraduate students who took the Advanced English for Academic Communication course.

## **LITERATURE REVIEW**

### **Research and Research Writing**

Bruffee (1985) states that research usually begins with a curiosity or a hunch. Research activity is undertaken the moment someone wants to learn about something or to find out if a hunch someone has is correct. According to Bruffee (1985), the process of research and research writing involves a complex mixture of analysis and synthesis of ideas and therefore, it is quite impossible to formulate a set of procedures or a code of rules for doing research. Brufee (1985) further states that in doing research, “researchers satisfy their curiosity on the topic they have chosen by informing themselves and by turning their first hunch into a series of progressively more refined, better educated hunches and finally into genuine understanding” (p.172). Bruffee further explains that the curiosity, the hunch and the desire to explain to other people about the research are some of the factors that can motivate and sustain a research. He added that by learning what knowledgeable people had written on the research topic in question, making a written contribution of their own and acknowledging the sources they have cited, researchers are making a bid to join those communities of knowledgeable people. Thus, in research writing, the aim is to explain to other people what has been discovered through following our hunches and satisfying our curiosity.



## Collaborative Writing and Group Work

Many people assume that writing is a solitary endeavour. However, this is not so in 'real-world context' (Bruffee, 1985, Murray in progress). According to Heath (1983), members of the communities often talk about their letters and memos and ask for advice in their writing. Furthermore, at the workplace, managers and workers often discuss their memos and reports whereby they give comments, add to or make changes to each other's texts (Doheny-Farina, 1986, Halpern, 1985, Harwood, 1982, Murray in preparation, Paradis, Dobrin and Miller, 1985, Selzer, 1983 & Spretnak, 1982 as cited in Murray in progress). What these researchers have shown is that in real-life, writing is a collaborative act and involves aspect of social adaptation. This has pedagogical implications on the teaching and learning of writing where writing theorists have called for collaborative tasks in the teaching of writing (Doheny-Farina, 1986, Odell, 1985 as cited in Murray). Collaborative writing involves cooperative learning (Kagan, 1986) or collaborative learning (Bruffee, 1984). Cooperative learning is said to be more appropriate for use with elementary schoolchildren while collaborative learning is meant for adults including college and university students (Bruffee, 1995). In collaborative learning, students are expected to have possessed the necessary social skills which elementary schoolchildren do not have, and the motivation to achieve their learning goals (Matthews et al, 1995). Numerous research done on collaborative writing have shown that there are many benefits of collaborative learning which include increased level of reasoning and critical thinking, increased retention of the subject matter, encouraged student responsibility for learning, a more positive attitude towards the integration of writing in the curriculum and increased motivation to improve writing (Johnson and Johnson, 1989). These benefits can be achieved through working in groups as collaborative learning is based on the assumption that knowledge is best gained through social interaction and not simply from the teacher



to student. According to Johnson and Johnson (1991), a successful cooperative learning experience consists of students working in a group under the following conditions: (1) group members must share positive interdependence, (2) group members must work together as individuals, (3) group members must have individual accountability and personal responsibility, (4) group members must have interpersonal and small group skills and (5) group members must evaluate the process.

### **Generic Skills and Graduate Attributes**

Over the years, there has been an increased focus by universities on generic graduate attributes or what is known as generic skill. The term 'generic skills' refers to a range of qualities and attributes that are increasingly viewed as important in higher education. These include skills such as logical and analytical reasoning, problem solving, effective communication skills and the ability to identify, access and manage knowledge and information, personal attributes such as imagination, creativity and intellectual rigour and values such as ethical practice, persistence, integrity and tolerance (Hager, Holland and Beckett, 2002). As stated in The Kirby Report, generic skills are important for employability where employability is discussed in the context of changing socio-economic and work conditions (cited in Hager, Holland and Beckett, 2002). Today, it is no longer sufficient for graduates to simply acquire disciplinary knowledge to guarantee them a job upon graduation. Employers expect their graduates to be able to function efficiently in an ever-changing work environment and demonstrate to the employers their ability to apply the generic skills that they have acquired in various contexts ([www.utas.edu.au](http://www.utas.edu.au)). These skills can be developed through various in-class learning activities such as class discussion, brainstorming sessions, group work, presentations and many other activities.







## **METHODOLOGY**

The research conducted adopted the quantitative and qualitative approach. Quantitative approach was adopted as a result of using the data from the questionnaires and analyzing them using frequency counts. On the other hand, qualitative data came from the open-ended questions in the questionnaire. Corbin (1990) defines qualitative research as any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification. Although the data from qualitative research may be quantified but the analysis itself, is a qualitative analysis. For example, data collected through interview and observation are coded and statistically analyzed. This, according to Corbin (1990), is quantifying the qualitative data.

The research instrument used for this study was a set of questionnaires piloted and designed using both closed and open-ended questions. The set of questionnaires was designed to seek information on students' perceptions toward the data collection process.

A total of 149 students from three engineering faculties were selected as the respondents of the study. They were selected as respondents based on their experience attending the Advanced English for Professional Communication Course in their second year undergraduate program.

## **FINDINGS AND DISCUSSION**

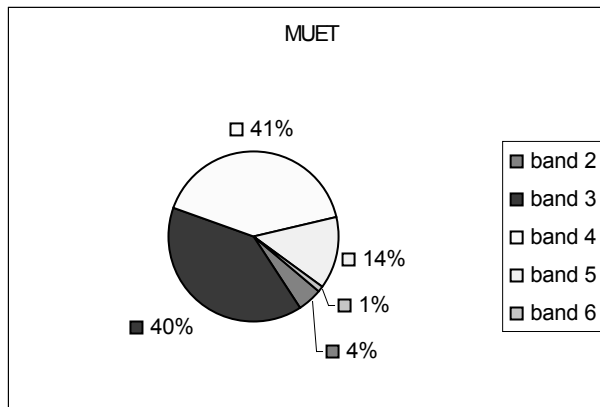
The following shows the overall findings of the survey conducted via a set of questionnaires distributed to 149 undergraduate students from three engineering faculties who took the Advanced English for Academic Communication course in their second year of study. The purpose of the survey was to investigate the students' perception of



the data collection activity that was done as part of a small research assignment done in groups.

Generally, this section reveals the background of the respondents, their knowledge about doing research prior to taking the Advanced English for Academic Communication course and after, the problems that they faced in doing research and ways that they used to overcome the problems that they encountered.

### Background of the Respondents



**Figure 1 : Respondent's MUET Score**

One of the requirements for students to study in a public university is that they need to sit for the Malaysian University English Language Test (MUET). Based on the MUET score of the respondents that is shown in Figure 1, majority of them (81%) scored Band 3 and 4 (40% Band 3 and 41% Band 4). Therefore these students are considered to have average English Language proficiency level. 14% obtained Band 5 and only 1% scored Band 6 so these students are considered



to be very proficient in the English language. Another 4% were placed in Band 2 and students who are in this band are considered not proficient in English.

### **Overall Knowledge of the Research Process**

Students were asked questions pertaining to the knowledge that they have about conducting research work using the English language especially in the data collection and analysis process before and after taking the Advanced English for Academic Communication course. The overall results of the survey revealed that there was an increase in students' knowledge as well as the language used for research purposes.

One of the requirements of the course is that students need to design their own research instruments in order to collect their own primary data. At the same time, they are also expected to develop a section on literature review for their research project using secondary data that could be obtained from the university library or through the Internet. For that reason, students are taught how to design different types of research instruments that they could use in their project and are also given guidance on ways to find relevant articles for their chosen topic. Using the secondary materials obtained, they are then taught to do proper in-text citations and paraphrasing techniques. Some examples would be questionnaires, interviews and observation.

Based on this, the results shown in Table 2 reveal the students' perception of their knowledge in conducting research prior to and after taking the course. Generally, it can be seen that the students perceived that their knowledge in doing research using the English language has increased. This is because when asked about their ability to design questions for either questionnaires or interviews using the English language, a majority of the respondents claimed that they knew quite a lot after taking the course. In fact,



when asked about their knowledge in using the English language to prepare questions before taking the course, 20.4% said they knew nothing while 64.6% revealed that they knew a little. This however changed after they took the course where 62.8% of the students said that they knew quite a lot and 30.4% knew a lot.

KNOWLEDGE	before	after	before	after	before	after	before	after
	nothing		know a little		know quite a lot		know a lot	
difference between primary and secondary data	33.8	0	58.8	2.7	6.8	56.7	0.7	40.7
types of research instrument	29.7	0	58.1	5.3	12.2	64	0	30.7
how to use data for research	31.8	0	58.8	4.7	9.5	66	0	29.3
how to collect data for research	19.6	0	54.1	1.3	25	54.7	1.4	44
how to design questionnaires	31.3	0	56.5	2	11.6	58.1	0.7	39.9
how to design questions for interviews	28.4	0.7	58.8	10	11.5	66	1.4	23.3
the language used to prepare questions	20.4	0.7	64.6	6.1	12.9	62.8	2	30.4
how to analyze data	27.0	0	57.4	2.7	14.2	54.7	1.4	42.7
how to interpret data	31.8	0	56.1	5.3	10.8	66.7	1.4	28

**Table 2:** Respondents' Knowledge of Doing Research

Apart from that, Table 2 also shows a significant increase in respondents' perception of their ability to analyze and interpret data using the English language. Before conducting the research, 27% of the students had no idea how to analyze data while another 57.4% said that they knew only a little about it but after completing the research, the students claimed that they now knew more about it with 54.7% knowing quite a lot and 42.7% knowing a lot about the process. As for data interpretation, 31.8% claimed that before taking this course they had no knowledge at all of this activity and 56.1% had only a little knowledge. However, after taking the course, a majority of them (94.7%) claimed that their knowledge of interpreting data in the English language had increased (66.7% knew quite a lot about it and 28% knew a lot about it). The marked increase in students' knowledge of these two activities is most probably due to the thorough explanations given in the textbook on how to analyze and interpret data, together with input given by the lecturer in class. Besides that, the process of drafting questions for the questionnaires and interviews and also the written report are closely monitored throughout the semester during specific consultation time with each group.

### **The Problems Faced in Doing Research**

This study also uncovers the problems that the respondents faced when going through the research process. Students were asked about problems in designing instruments and in analyzing data using the English language. The following 2 tables show the problems that students encountered in designing research instruments and analyzing data.



Problems	yes	no
how to design the questions	52.3	47.7
the language used for designing questions	53.7	46.3
what questions to ask	61.1	38.9

**Table 3:** Problems in Designing Research Instruments

Problems	yes	no
language used to analyze the data	58.4	41.6
how to analyze/interpret the data	54.5	45.6
how to write the interpretation	55.7	44.3
how to write the data analysis	52.3	47.7

**Table 4:** Problems in Analyzing Data

Overall, the above two tables, show that slightly more than half of the respondents (52% to 62%) said that they encountered problems in designing and analyzing data using the English language. For example, 53.7% of the respondents declared that they had problems in the language used for designing questions for their research instruments while 58.4% of the respondents said they had problems in analyzing data.



To gain more insights into these results, looking at the respondents' background, majority of them scored either Band 3 or 4 for their MUET which means that these students belong to the average proficiency level. Based on past experience teaching students who are placed in these bands, it was found that students faced problems with grammar and writing coherent and clear paragraphs. When designing questions for questionnaires and interviews for example, some students had difficulty in using verbs such as 'do' and 'are' and had problems in using 'wh'-questions as shown in Table 5.

e.g.	Do you satisfy with the PSZ facilities?
	Are you agree with Smart Day Campaign?
	Why you go to the library?
	Where you go shopping?
	How frequently you exercising?

Table 5: Language Errors in Forming Questions

Language errors were also found in students' writing when they analyzed and interpreted data as shown in Table 6 below:

Twenty one of the respondents <b>are done the</b> exercise weekly. It is because they only have free time <b>at</b> weekend to <b>do</b> exercise. Another 13 <b>persons of the respondents are done the</b> exercise everyday. For <b>the</b> reason, they are very conscious about their health. Another 9 persons <b>did not are not doing any</b> exercise because they not interested or maybe they do not care about their health. Seven <b>persons of the respondents only done the</b> exercise monthly because they are busy and do <b>no</b> have enough time to <b>do</b> exercise.
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**Table 6:** Language Errors in Data Analysis and Data Interpretation

### Alternative Ways of Solving Problems Faced in Doing Research

Table 7 depicts the ways that students chose to solve problems related to carrying out the research project. In general, more than 70% of the respondents believed that they were able to overcome their problems in doing research by sharing and discussing the problems with their research team members or by discussing with or consulting their language instructors.

Ways of Solving the Problem	Analyzing Data		Designing Instruments	
	yes	no	yes	No
discussed it with members of the team	87.9	12.1	77.9	22.1
consulted the UHB 2422 book	79.2	20.8	65.5	34.5
discussed it with my lecturer	73.8	26.2	70.9	29.1
consulted materials from the web, books, etc.	24.2	75.8	22.8	77.2
left it to the lecturer to correct/comment	29.5	70.5	26.4	73.6
others	0.7	99.3	0	100

**Table 7:** Ways of Solving Problems Faced in Doing Research



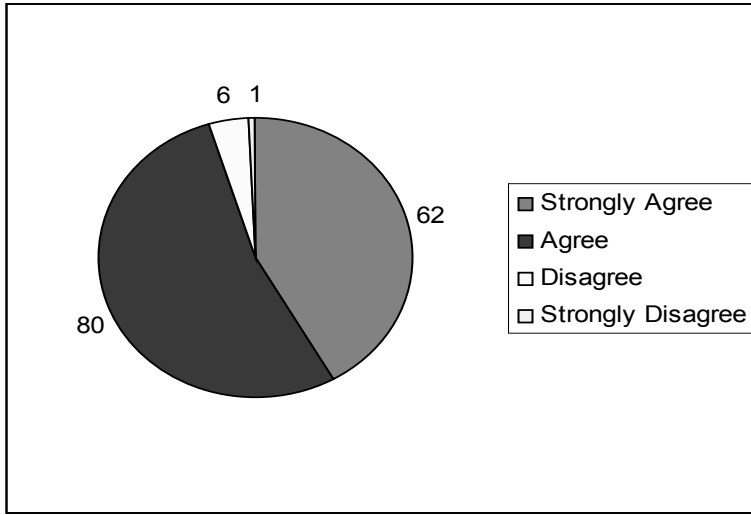
Discussion with peers and consultation with their language instructor can help the respondents improve on their communication and interpersonal skills, critical thinking skills and develop more self-confidence in themselves. The following are some of the comments made by the respondents in relation to the two activities:

I learn how to cooperate and communicate with different people  
I learn teamwork and improve my spoken English  
Improve my language  
Be more confident in speaking  
Solve problem together, share ideas with group members

**Table 8:** Feedback on Group Discussion and Consultation Activities

Apart from discussions and consultations, 79.2% of the respondents also claimed that they relied on the main resource book for the course when they encountered problems in the use of the language while doing research. This is most likely due to the fact that explanations and examples on language use are provided in the book.

**Group Work**



**Figure 2 :** Importance of group cooperation

With regards to the issue on working in groups, Figure 2 shows the results on students' perception of the importance of teamwork in doing the research project. Majority of the students either agree or strongly agree that it is important for them to cooperate with one another in order to carry out the research project assigned to them.

Among the reasons that they gave for agreeing that group effort is important for the research project are listed in Table 9.





Sharing or distributing jobs makes the data collection process done more easily Takes less time to complete the data collection  
Saves time and energy We can share and exchange ideas throughout our research project Get different and wider perspectives in analyzing data  
Makes work easier and can come up with better ideas, two heads are better than one When solving problems there are always hands to help

**Table 9 :** Reasons why teamwork is important

Apart from the reasons given as to why it is important to work together as a team, the respondents also shared their views about possible soft skills that could be developed through the group research project. The following table shows some examples of soft skills mentioned by the respondents in the survey conducted.

Teamwork  
Cooperation  
Understanding  
Communication  
Create bond  
Independence  
Able to meet unexpected challenges or face unpredictable events  
Cooperative learning  
Negotiation

**Table 10 :** Soft skills perceived to have developed through the research project





## CONCLUSIONS

The overall findings of the study show that there is an increase in students' knowledge of the research process after they have undergone the English for Academic Communication course. The students also have shown the ability to design research instruments and report their research findings using the English language. Apart from that, the study also reveals the problems that students faced in designing research instruments and in analyzing and interpreting data obtained using the English language. Based on the problems revealed, it was discovered that majority of the students chose to overcome problems encountered by discussing about the problems with their team members, consulting their language instructor and referring to the main reference designed for the purpose of helping students to carry out and report research work using the English language.

It is important to note at this point that the students who undergo the Advanced English for Academic Communication course experience different types of training, one: discovering ways to conduct and report research findings, two: learning to communicate and conduct research work using the English language, and three: developing soft skills through working in a team. This research has therefore shown favorable outcomes that are parallel to the overall aims of incorporating different skills within one course offered to students at the university. For example, the level of students' knowledge of the research activities before and after the course has increased. The study also reveals the broadness of the spectrum that differentiates students who started off not knowing how to conduct research at the beginning of the course to those very same students who were able to work as a team to complete their research project.

Apart from that, the findings of the study also shows that through the research project, students acquired the experience of handling and solving problems by discussing and working together





with friends and/or consulting the lecturer or the main reference used in the course. In other words, this study has shown evidence that strongly points to the relevance and significance of the course in developing various crucial soft skills through group research project. This is important as it supports the university's effort in producing professionals who are not only able to secure jobs in the industries because of their excellent academic standing but also those who possess soft skills that would enhance their credibility and integrity.

## **RECOMMENDATIONS**

Although the study indicates that the course has helped the students develop their soft skills through group research work, it can be observed that there is still room for improvement to further meet the needs of the individual students. First and foremost, it can be observed that when students faced various problems during their course, the most favored method of overcoming them was through discussion with teammates. In order to carry out this task effectively, at the outset, students would need certain discussion skills like giving and asking for opinions, concurring and disagreeing and negotiating meaning. As a result, the students would benefit more if the course contained some input and practice in these skills. Furthermore it is also strongly recommended that the class size be reduced to enable students to participate more in smaller groups. Currently, the number of students per class averages at 45 and this would be a difficult number to accommodate in terms of language development. In addition, smaller class sizes could lessen the likelihood of developing 'passengers' who do not really contribute to the group.



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